Aviation Weather Services

Vision

To develop, deploy, and operate an efficient and accurate aviation weather services program, and to deliver timely and accurate weather information required for safe and efficient operation of the National Airspace System (NAS).

Concept of Operations

Weather and its related impacts are the single greatest cause of disruption to the American aviation system. Weather disruptions account for approximately 70 percent of delays in the NAS and nearly 200 general aviation fatalities annually. The aviation weather services program focuses on the following areas to develop and deliver products that reduce weather-related delays and increase safety:

- ✓ Coordinate global, international, and regional aviation standards, recommended practices, and operational issues to protect U.S. policy and interests.
- ✓ Integrate NWS resources at the national, regional, and local levels.
- ✓ Leverage interagency research and development efforts to improve observational capabilities and forecast products.
- ✓ Increase the quality and quantity of weather observation sets.
- ✓ Improve accuracy and operational relevance of aviation weather forecasts.
- ✓ Deliver aviation weather products in formats that are easy to use and easily verifiable.
- ✓ Train users in the availability and use of forecast products.

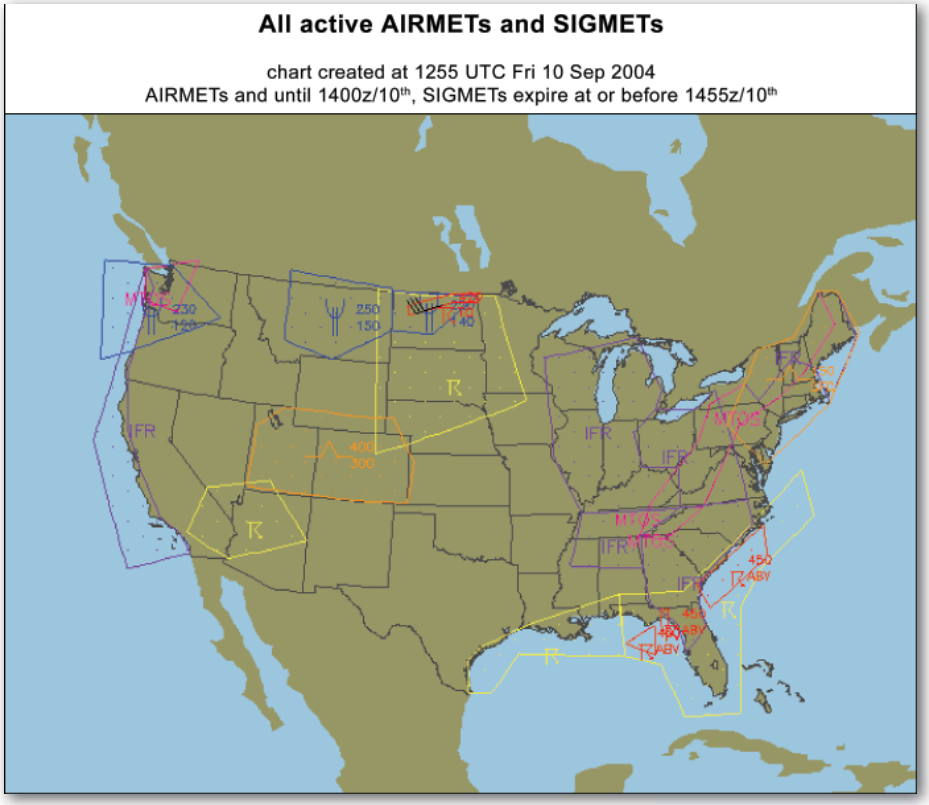
Customer and Partner Requirements

Requirements for the following capabilities have been developed in close cooperation with the Federal Aviation Administration (FAA) and the aviation industry:

- ✓ Obtain aviation-relevant observation data to deliver products meeting FAA accuracy requirements.
- ✓ Improve observations from aircraft.
- ✓ Deliver all aviation weather products in user-friendly formats.

- ✓ Train all aviation meteorologists, air traffic controllers, briefers, dispatchers, and pilots on the use of aviation weather products.

- ✓ Verify all aviation products in near real-time for forecaster feedback and increased user confidence.



Graphic representation of all active AIRMETs and SIGMETs found on the Aviation Digital Database Web site at: http://adds.aviationweather.noaa.gov/data/airmets/airmets_ALL.gif. AIRMETS and SIGMETs will be enhanced by the expanded collection of PIREPS.

Link to Science and Technology Infusion Plan

The aviation program leverages science and technology initiatives to increase the accuracy, specificity, and lead time of aviation forecasts and warnings, for more effective planning and decision making. Specific science and technology areas of focus include:

- ✓ Increase the resolution of wind and temperature observations.

- ✓ Improve the data quality and timeliness of wind and moisture observations.

- ✓ Expand aircraft observations.

- ✓ Improve model physics (Regional Common Atmospheric Modeling System) with rapid refresh rates.

- ✓ Incorporate the vertical dimension of aviation forecast parameters in the Interactive Forecast Preparation System.

- ✓ Develop probabilistic forecasts targeted to the FAA and U.S. airline decision support systems.

Product and Service Changes

- ✓ Deliver satellite-developed volcanic ash detection product to NOAA's Volcanic Ash Advisory Center, Weather Forecast Offices (WFOs), the Alaska Aviation Weather Unit (AAWU), and Aviation Weather Center (AWC).

- ✓ Deliver satellite-developed low cloud detection products to WFOs, the AAWU, and the AWC.
- ✓ Transition the Real Time Verification System (RTVS) capability from NOAA's Forecast Systems Laboratory (FSL) to operational use within NWS.
- ✓ Transition the Super Cooled Large Droplet (SCLD) product derived from the Forecast Icing Potential (FIP) product from the Aviation Weather Research Program (AWRP) to operational use within the NWS.
- ✓ Deliver hardware required to host expanded aviation databases to the AAWU and the AWC.
- ✓ Update the Aviation Forecast Preparation System (AvnFPS).
- ✓ Offer Distance Learning Aviation Course 2 (DLAC2) training on convective forecasting.
- ✓ Offer Aviation Operations Course (AOC) for NWS forecasters.
- ✓ Deliver updated general aviation pilot "interpretation of weather products" training seminar in cooperation with the Aircraft Owners and Pilots Association (AOPA).

Science and Technology Requirements

- ✓ Increase understanding of fundamental physics.
- ✓ Improve algorithms.
- ✓ Improve high-speed processing.
- ✓ Incorporate the vertical dimension of aviation forecast parameters into the Interactive Forecast Preparation System (IFPS).

GPRA Performance Measures

The aviation weather services program GPRA performance measure is the percentage of time that Instrument Flight Rules (IFR) conditions are correctly forecast. The Probability of Detection (POD) and the percentage of time that IFR conditions are predicted but do not occur, called the False Alarm Rate (FAR), comprise the GPRA metric.

GPRA Performance Measures

GPRA Goal*	FY 2003	FY 2004	FY 2005
Probability of Detection	45%	46%	46%
False Alarm Ratio	71%	70%	68%

* IFR Conditions are defined as Ceilings ≥ 500 ft & <1000 ft, Visibility ≥ 1 mile & <3 mile

Weather-related operational disruptions in the NAS, and weather-related flight mishaps are associated with conditions requiring aircraft to operate under IFR. Therefore, providing pilots, dispatchers, and flight controllers with accurate and reliable forecasts of IFR conditions, particularly in the 2-to-6 hour forecast

time frame, will substantially reduce both disruptions in scheduled flight operations and the number of flight mishaps caused by inadvertent entry into flight conditions that exceed pilot capabilities.

Other Performance Measures

In addition to tracking performance against the GPRA IFR forecast accuracy metric, the Aviation Services branch tracks 11 performance measures that quantify our progress in satisfying customer and partner requirements:

- ✓ Increase the number of aircraft reported in-situ observations.
- ✓ Increase the number of satellite products produced.
- ✓ Improve the accuracy of convective forecasts.
- ✓ Improve the accuracy of ceiling and visibility forecasts.
- ✓ Decrease weather-related accidents per 100,000 flight hours.
- ✓ Reduce the percent of air traffic delays attributed to weather.
- ✓ Increase the number of U.S. airports serviced with Terminal Aerodrome Forecasts (TAF).
- ✓ Increase the number of new or improved forecast products.
- ✓ Increase the percentage of NOAA operational weather products integrable with navigation and traffic management systems.
- ✓ Increase the percentage of personnel trained on aviation weather products.
- ✓ Release at least one new or improved aviation training course per year.

Milestones by Quarter

1st Quarter

- Deliver satellite-developed low cloud products.
- Update AvnFPS.
- Deliver training material for AOPA/ Air Safety Foundation (ASF) general aviation pilot "Interpretation of Weather Products" training seminar.

2nd Quarter

- Deliver satellite-developed volcanic ash detection product.

3rd Quarter

- Deploy hardware for new and expanded aviation databases.
- Deliver the SCLD product derived from the FIP, to the AWC.
- Update AvnFPS.

4th Quarter

- Test DLAC 2 for convective forecasting.
- Deploy RTVS to the NWS.
- Install at least 25 water vapor sensors on aircraft for in-situ observations.

Integrated Requirements

✓ Help set international requirements for aviation meteorology and development of forecasting tools by participating in International Civil Aviation Organization (ICAO) meetings.

✓ Develop and deploy a system to capture moisture and turbulence measurements from available air carriers.

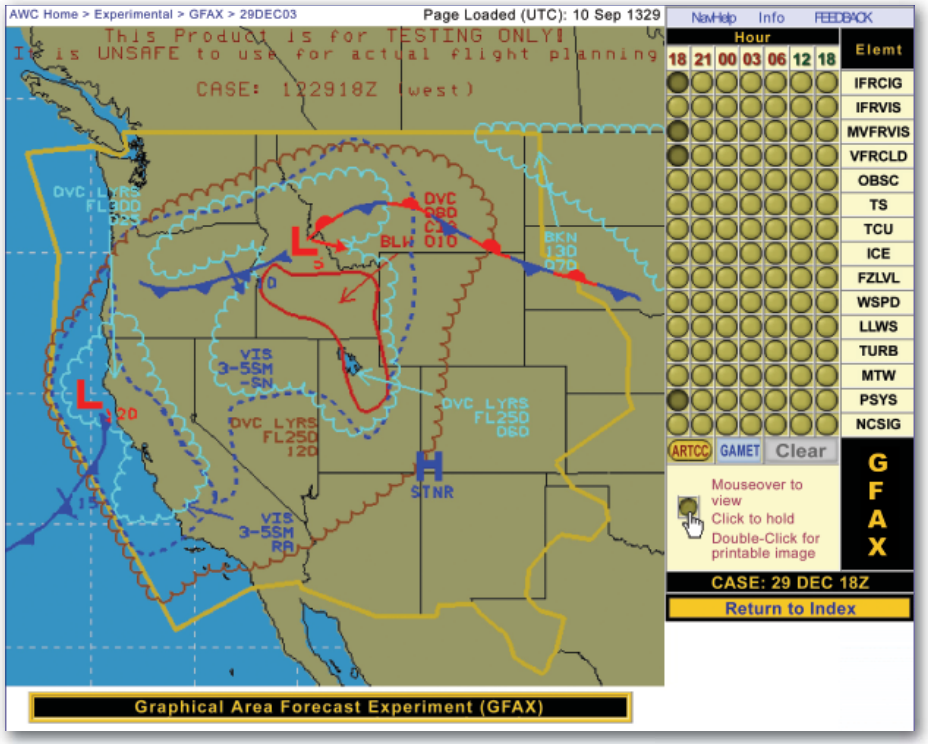
✓ Expand collection and use of General Aviation PIREPS from 2,000 to about 5,000 daily to fill a void in reporting en-route conditions.

✓ Continue transition of applied research efforts focused on improved observing capabilities, detection, and forecast accuracy.

✓ Continue development of DLAC courses and aviation exercises for incorporation into the NWS forecaster weather event simulator.

✓ Continue work with AOPA, ASF and Meteorlogix, Inc., to develop online general aviation pilot weather training.

✓ Continue development of Meteorologist "In the Loop" capability for FAA/AWRP automated products.



Example of the experimental Graphical Area Forecast over the Western region

- ✓ Continue developing of initial Guidance TAF. The Guidance TAF capability, generated by higher resolution model output, will significantly improve forecaster efficiency. This capability will allow for the production of significantly more TAFs without increasing staff, and allow local forecasters to focus on short-term\terminal forecasting and severe weather warnings.

- ✓ Continue developing the integrated forecast process to strengthen Center Weather Service Unit (CWSU)/Air Route Traffic Control Center (ARTCC) operations.

- ✓ Conduct operational test and evaluation of terminal (hub) forecast and Tactical Decision Aid (TDA) at selected CWSUs.

- ✓ Continue work with the NOAA, DOC, FAA and the Office of the Federal Coordinator for Meteorology (OFCM) at the Joint Planning and Development Office to publish a national strategic plan for aviation weather.

- ✓ Work with the FAA and aviation users to continue developing of the graphical aviation forecast to provide aviation weather information in a digital format in 2006.

Outreach

- ✓ Work closely with the FAA and National Aeronautics and Space Administration (NASA) to foster better working relationships and facilitate requirements setting.

- ✓ Work closely with aviation industry representatives such as AOPA, the NBAA, the Air Transport Association (ATA), the International Air Transport Association (IATA), the Small Aircraft Manufacturers Association (SAMA), the Helicopter Association International (HAI), and the Experimental Aircraft Association (EAA) to foster better relationships, to promote NWS aviation products and services, and to ascertain additional customer requirements.

- ✓ Exhibit at trade shows such as AOPA National and local Fly-Ins, NBAA National Meeting, HAI International Meeting, and 2005 EAA Sun 'n Fun Fly-In and Air Venture.

Verification

The ability to conduct automated real-time verification of new or improved observational capabilities and forecast products is developed in parallel with each capability and product. When capabilities and products are delivered, the ability to conduct real-time verification is delivered with them.

Regional Initiatives

Alaska

- ✓ Integrate newly developed Volcanic Ash Coordination Tool (VACT) into Anchorage Volcanic Ash Advisory Center (VAAC) daily operations.

- ✓ Develop an implementation plan to transition AAWU operations over to Graphical Area Forecast (GFA).

- ✓ Use new "Stats on Demand" verification system to develop a standardized, region-wide TAF verification program that focuses on detecting and correcting potential TAF deficiencies.

Eastern

- ✓ Develop five new TAF sites.

- ✓ Generate site-specific Instrument Flight Rules (IFR) goals to supplement regional and national performance measures.

- ✓ Provide software for Weather Event Simulators to the CWSUs.

- ✓ Develop a Weather Event Simulator case for CWSU operations, incorporating the Collaborative Convective Forecast Product, the AWIPS Remote Display, and FAA's Weather and Radar Processor.

Southern

- ✓ Collaborate with FSL to improve short-term timing and location forecasts of convection near hub airports via the Meteorologist in the Loop initiative at WFO Dallas-Ft. Worth.

Western

- ✓ Issue a Regional Supplement enhancing the training program for forecasters preparing aviation products.

- ✓ Develop a baseline for the lead time of short-fused and long-fused Airport Weather Warnings.

Contact Information

Kevin Johnston, Acting Chief, Aviation Services Branch, 301/713-1726, ext. 116, or kevin.johnston@noaa.gov.